

CLAIMS

1. A resistance welding electrode comprising:

a first layer of a metal-carbide film that is formed by attaching or carbonizing of an electrode material on a surface of the resistance welding electrode by applying a voltage between a powder molding obtained by molding a powder consisting mainly of a metal powder that is likely to be carbonized or a metal compound powder or a powder molding obtained by heating the powder molding in a working fluid and the resistance welding electrode, to generate a pulse-like discharge in; and

a second layer obtained by forming a film consisting mainly of any one of chrome, nickel, iron, tungsten, and molybdenum on the first layer.

2. The resistance welding electrode according to claim 1, wherein

the resistance welding electrode consists mainly of either one of copper and iron.

3. The resistance welding electrode according to claim 1 or 2, wherein

the second layer is formed on the first layer by any one of plating, physical vapor deposition, chemical vapor deposition, and a method of generating the pulse-like discharge by applying the voltage between a powder molding obtained by molding a metal-based powder and the resistance welding electrode in the working fluid.

4. A method of manufacturing a resistance welding electrode, the method comprising:

forming a first film of metal carbide that is formed by attaching or carbonizing of an electrode material on a

surface of the resistance welding electrode, the forming including

disposing the resistance welding electrode in a working fluid;

5 disposing a powder molding obtained by molding a powder consisting mainly of a metal powder that is likely to be carbonized or a metal compound powder or a powder molding obtained by heating the powder molding in an opposite position to the resistance welding electrode, as
10 an electrode for discharge surface treatment; and

applying a predetermined voltage between the resistance welding electrode and the powder molding, to generate a pulse-like discharge; and

forming a second film consisting mainly of any one of
15 chrome, nickel, iron, tungsten, and molybdenum on the first film.

5. The method according to claim 4, wherein
the second film is formed on the first film by any one
20 of plating, physical vapor deposition, chemical vapor deposition, and a discharge surface treatment method of generating the pulse-like discharge by applying the voltage between a powder molding obtained by molding a metal-based powder and the resistance welding electrode in the working
25 fluid.

6. A resistance welding apparatus comprising:
a resistance welding electrode including
a first layer of a metal-carbide film that is
30 formed by attaching or carbonizing of an electrode material on a surface of the resistance welding electrode by applying a voltage between a powder molding obtained by molding a powder consisting mainly of a metal powder that

is likely to be carbonized or a metal compound powder or a powder molding obtained by heating the powder molding in a working fluid and the resistance welding electrode, to generate a pulse-like discharge in; and

- 5 a second layer obtained by forming a film consisting mainly of any one of chrome, nickel, iron, tungsten, and molybdenum on the first layer; and
- a power supplying unit that supplies an electric power to the resistance welding electrode.

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7. A part manufacturing line for performing a part welding, wherein

 the part welding is performed by using the resistance welding apparatus according to claim 6.